

Fish Community Characterization

Objectives

- Characterize fish community of PRSA semi-quantitatively on a seasonal basis (Late Summer/Early Fall 1999, Spring 2000)
- Use surveys to confirm/select representative species for contaminant tissue sampling program
- Conduct qualitative pathology investigation on fish not collected for tissue samples

Methods

- Three target sampling areas/stations in PRSA — lower, middle, and upper river
- Multiple gear types — gill nets, eel traps, minnow traps, crab traps
- Intensive fishing effort in Late Summer/ Early Fall 1999 (herein referred to as Fall 1999) and Spring 2000 — driven by tissue targets

Methods (cont.)

- Length, weight, and pathology information collected for several species
- Minnow traps set at 15 PRSA stations to collect mummichog tissue samples
- Abundance, dominance, and catch-per-unit-effort (CPUE) calculated
- No reference area for fish community investigation

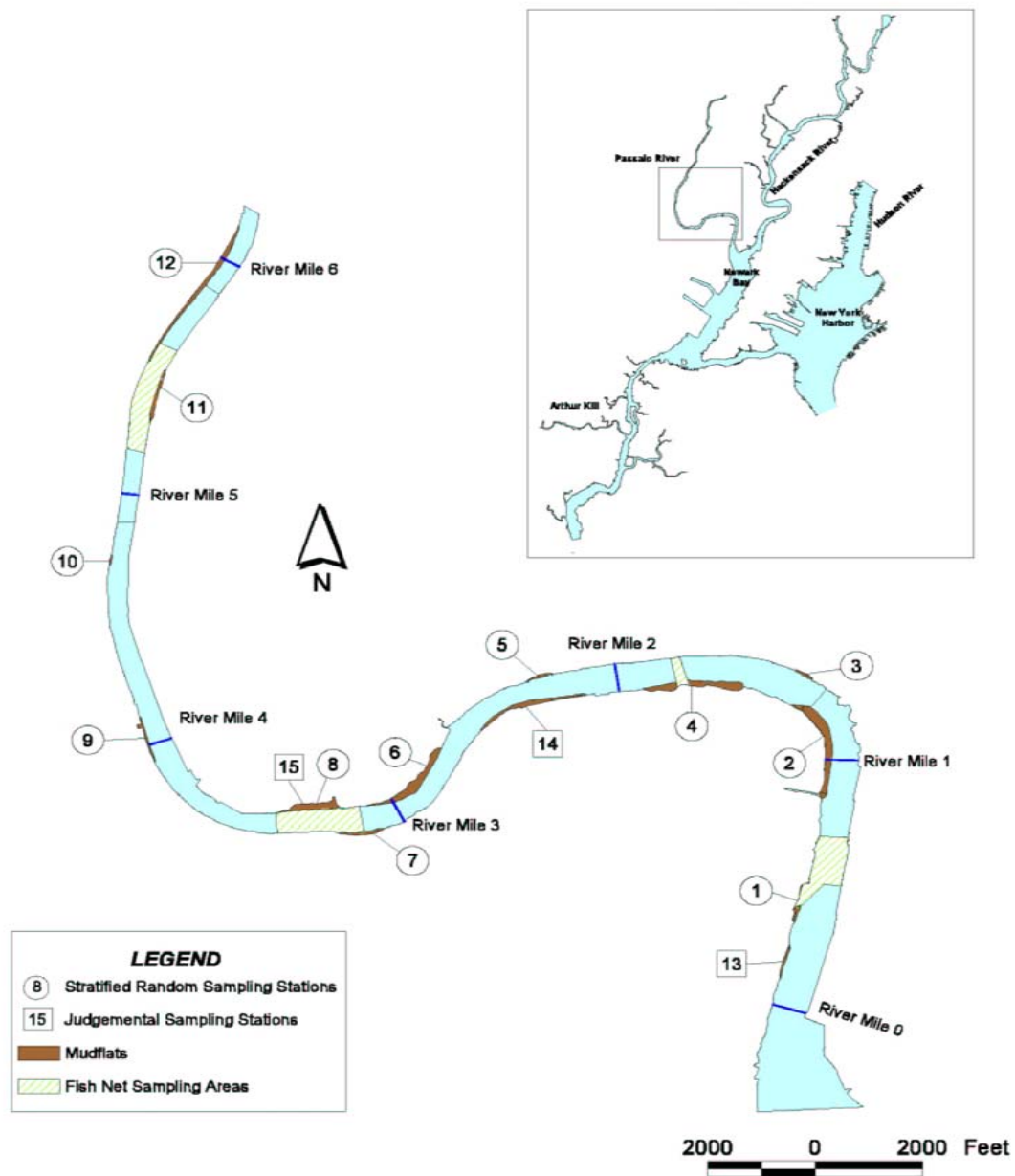
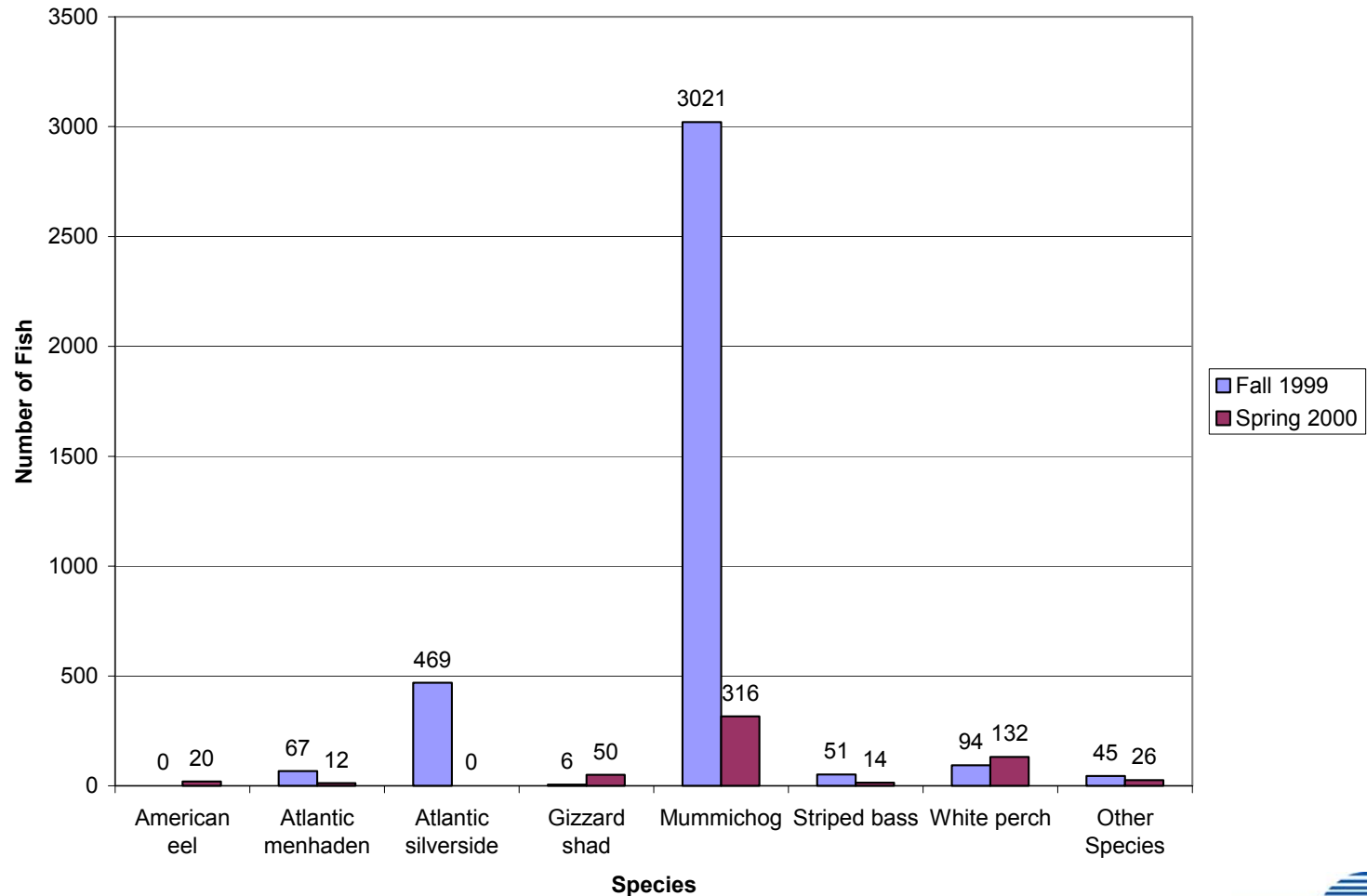


Figure 1. Passaic River Study Area Fish Sampling Stations

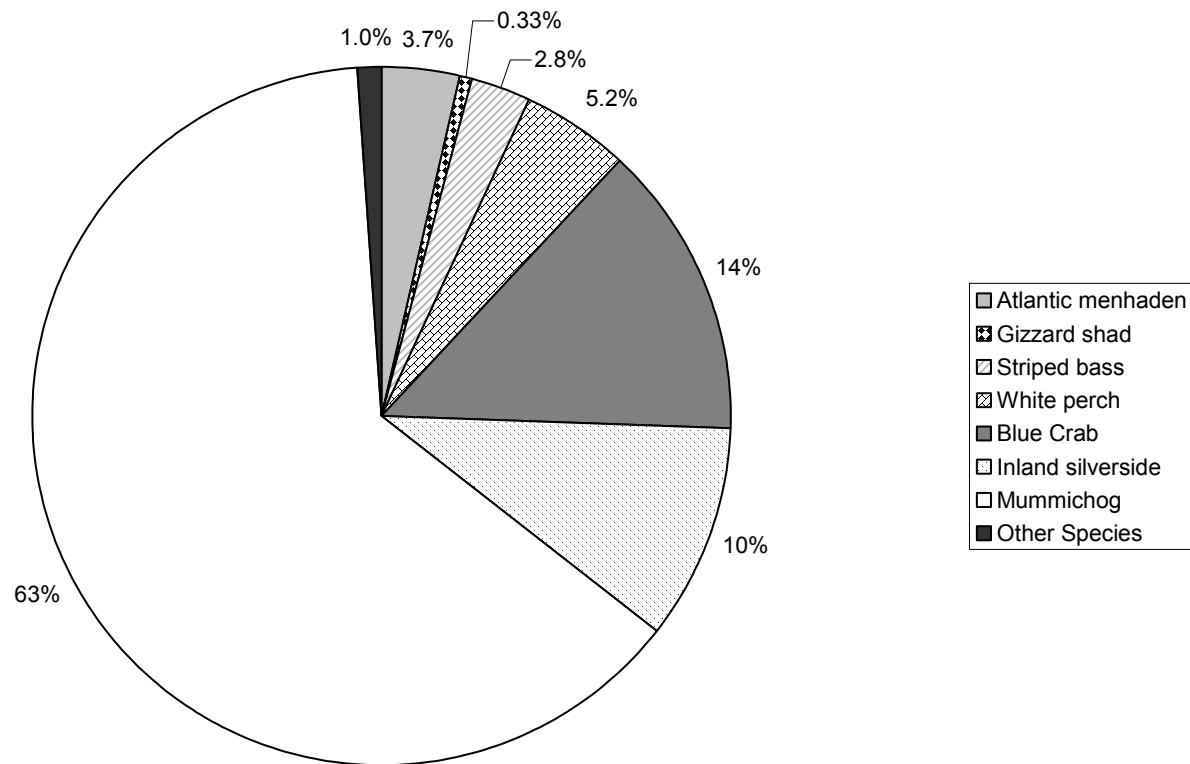
List of Species Caught in PRSA – Fall 1999 and Spring 2000

Common Name	Scientific Name	Fish Caught	
		Fall 1999	Spring 2000
American eel	<i>Anguilla rostrata</i>		X
Atlantic menhaden	<i>Brevoortia tyrannus</i>	X	X
Atlantic silverside	<i>Menidia menidia</i>	X	
Blueback herring	<i>Alosa aestivalis</i>	X	X
Bluefish	<i>Pomatomus saltatrix</i>	X	
Bluegill	<i>Lepomis macrochirus</i>	X	
Brown bullhead	<i>Ameiurus nebulosus</i>		X
Channel catfish	<i>Ictalurus punctatus</i>	X	
Common carp	<i>Cyprinus carpio</i>		X
Gizzard shad	<i>Dorosoma cepedianum</i>	X	X
Green sunfish	<i>Lepomis cyanellus</i>	X	
Inland silverside	<i>Menidia beryllina</i>	X	
Largemouth bass	<i>Micropterus salmoides</i>	X	
Mummichog	<i>Fundulus heteroclitus</i>	X	X
Redear sunfish	<i>Lepomis microlophus</i>	X	
Spotted hake	<i>Urophycis regio</i>		X
Striped bass	<i>Morone saxatilis</i>	X	X
Striped killifish	<i>Fundulus majalis</i>	X	
Summer flounder	<i>Paralichthys dentatus</i>	X	
Weakfish	<i>Cynoscion regalis</i>	X	
White catfish	<i>Ameiurus catus</i>		X
White perch	<i>Morone americana</i>	X	X
White sucker	<i>Catostomus commersoni</i>		X

Number of Fish Caught in the PRSA



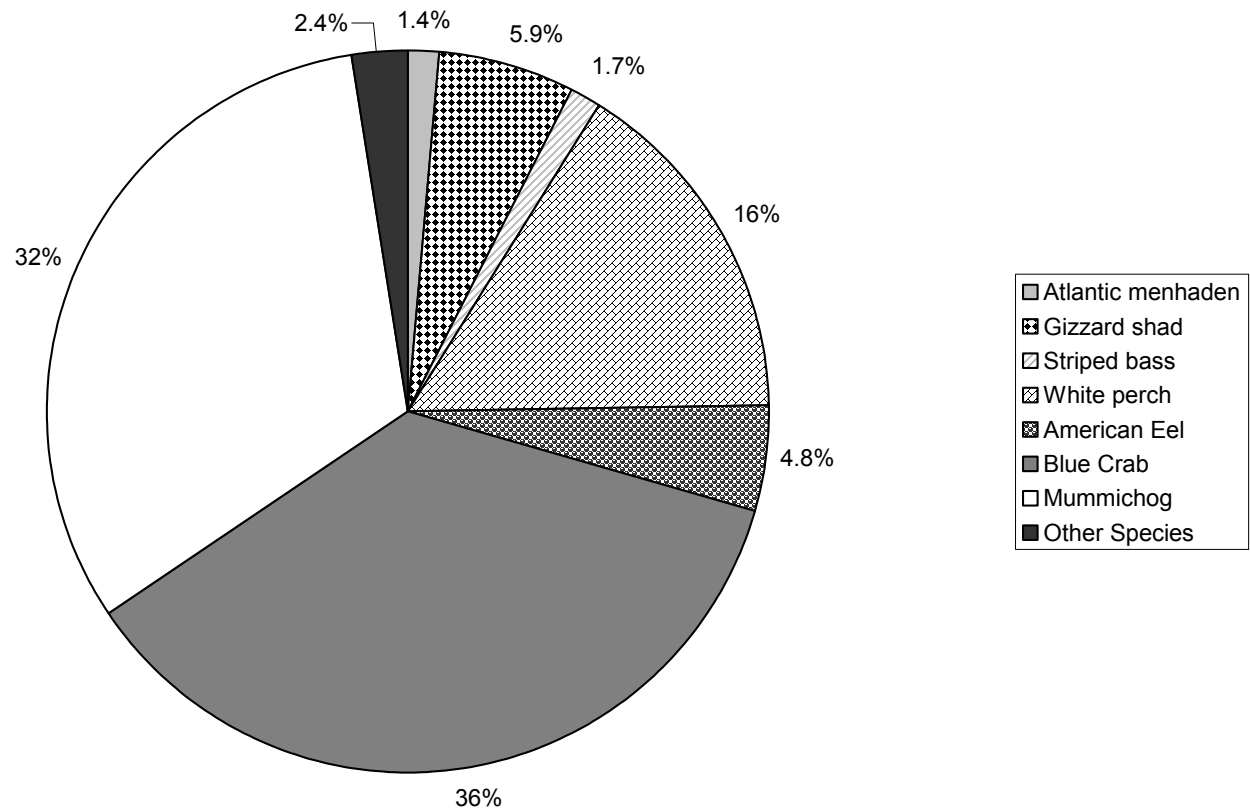
Percent CPUE Dominance of Fish Caught in the PRSA – Fall 1999



“Other Species” category includes blueback herring, bluefish, bluegill, brown bullhead, channel catfish, common carp, green sunfish, largemouth bass, redear sunfish, spotted hake, striped killifish, summer flounder, weakfish, white catfish, and white sucker.

Excludes incidental catch for each gear types (e.g., silversides in gill nets).

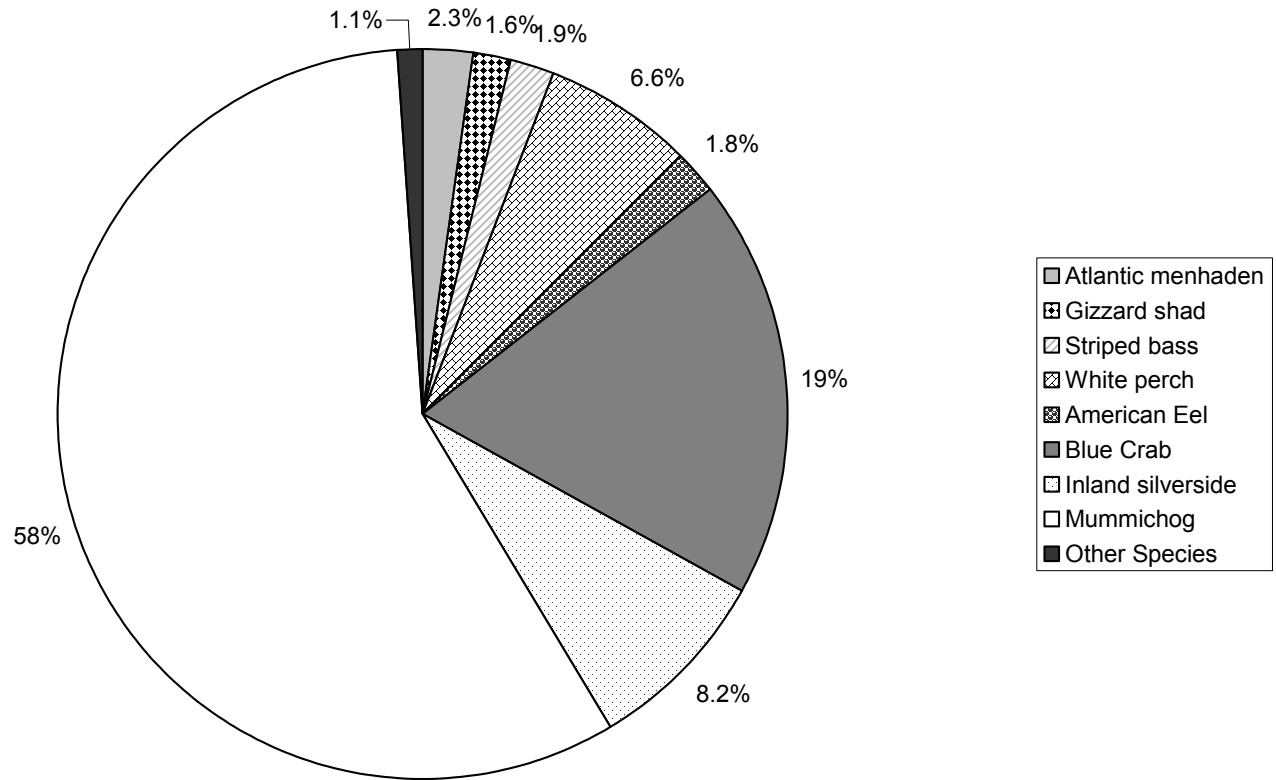
Percent CPUE Dominance of Fish Caught in the PRSA – Spring 2000



“Other Species” category includes blueback herring, bluefish, bluegill, brown bullhead, channel catfish, common carp, green sunfish, largemouth bass, redear sunfish, spotted hake, striped killifish, summer flounder, weakfish, white catfish, and white sucker.

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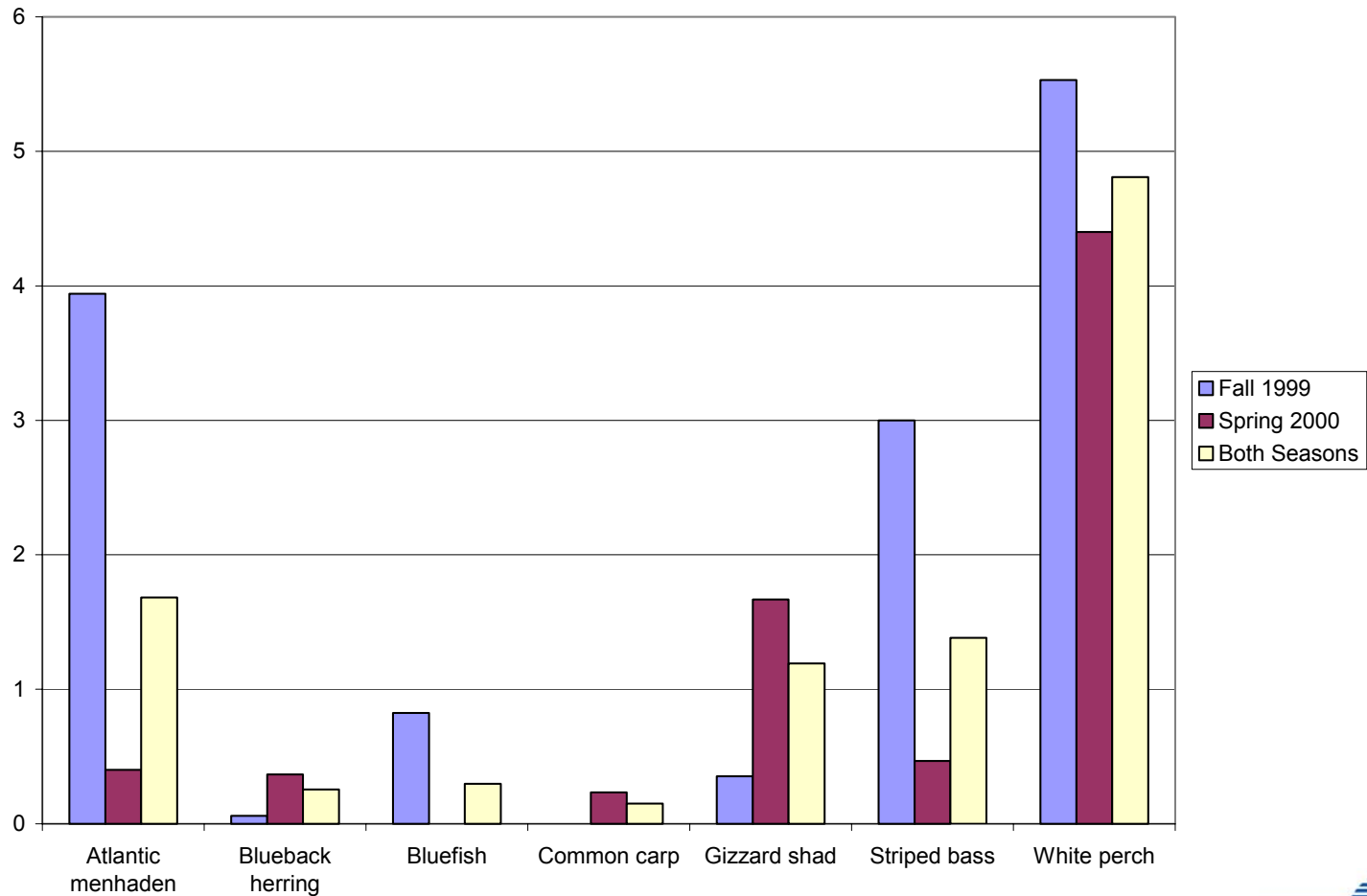
Percent CPUE Dominance of Fish Caught in the PRSA — Combined Fall 1999 and Spring 2000



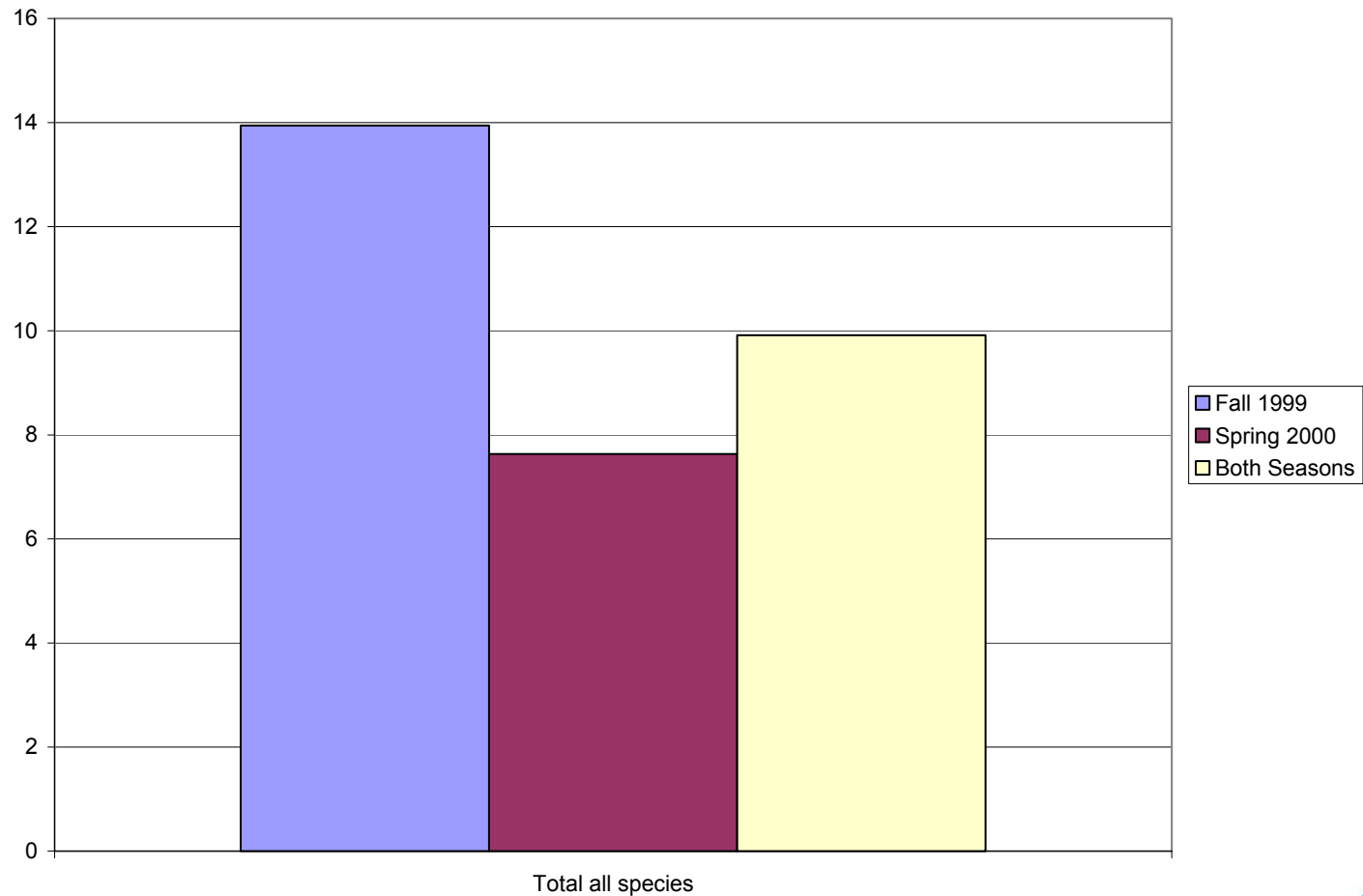
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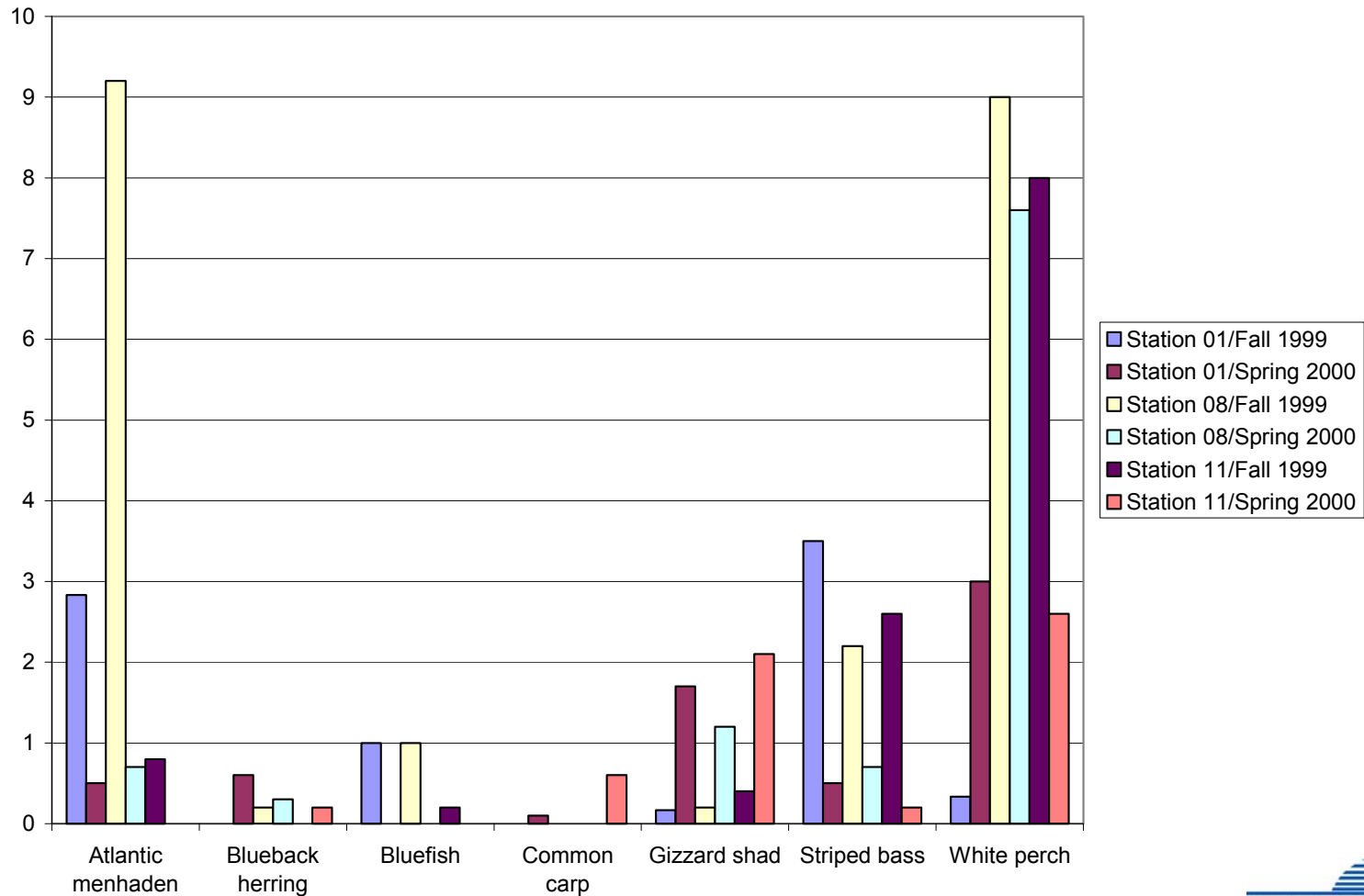
CPUE for Fish Collected by Gillnet from the PRSA



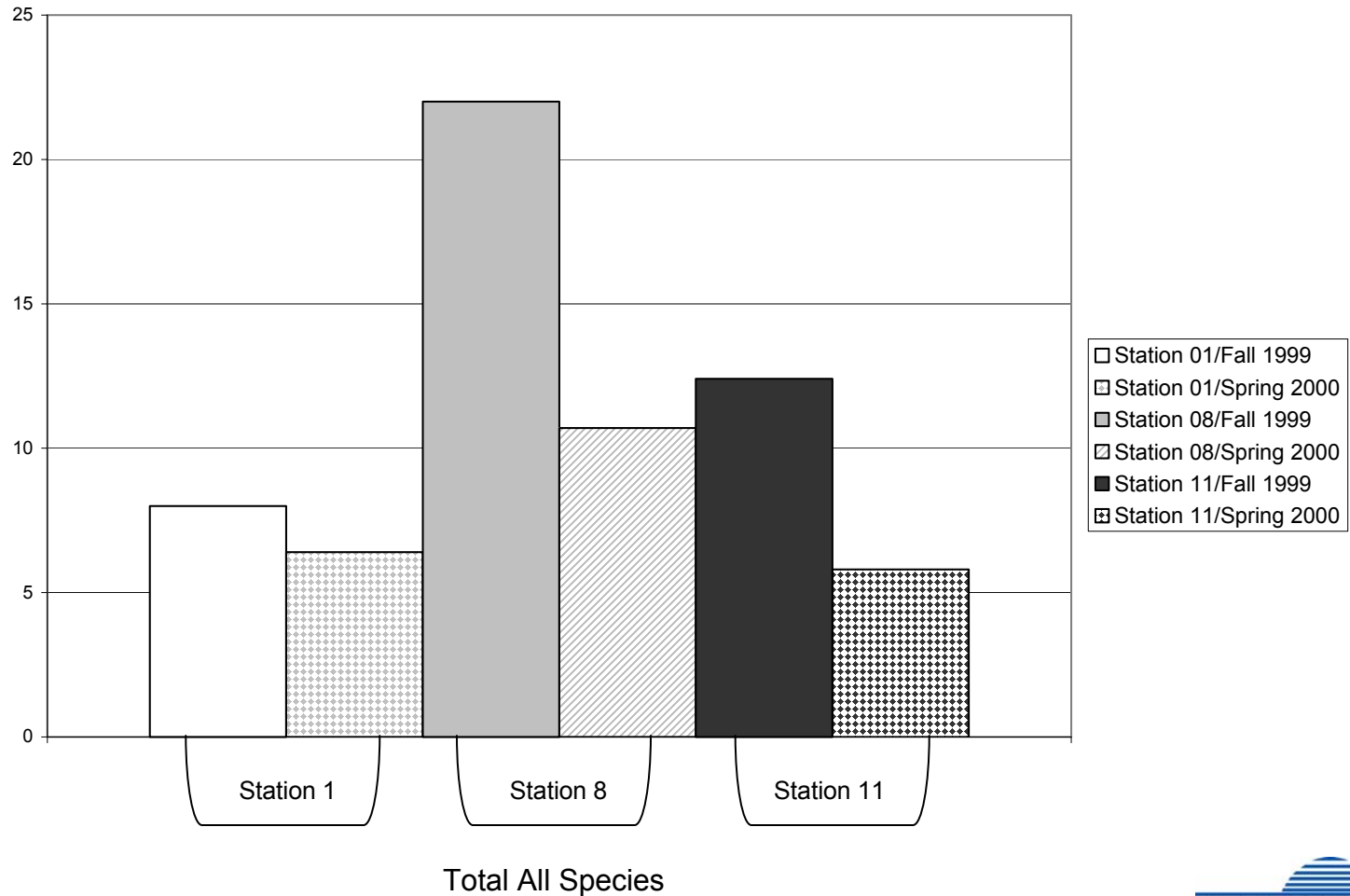
CPUE for Fish Collected by Gillnet from the PRSA



CPUE for Fish Collected by Gillnet from the PRSA by Station and Season



CPUE for All Fish Species Collected by Gillnet from the PRSA by Station and Season



Summary of Lengths and Weights for Fish Collected from the PRSA

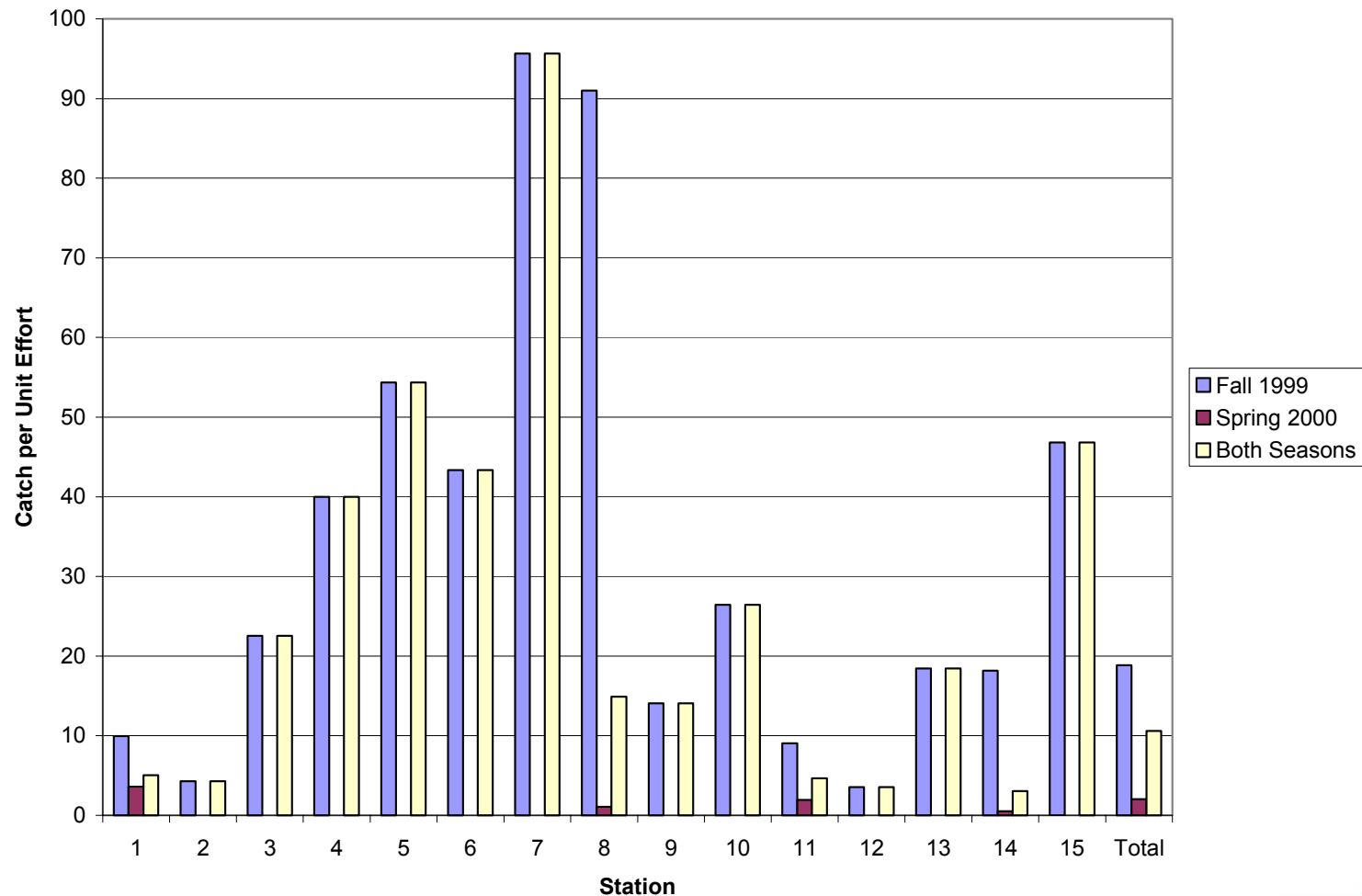
Combined Fall 1999 and Spring 2000							
	N ^a	Length (mm)			Weight (g)		
		Range	Mean	SD ^b	Range	Mean	SD ^b
American eel	20	230 - 630	366	102	20 - 499	120	119
Atlantic menhaden	57	86 - 375	307	67	9 - 691	340	154
Blueback herring	9	225 - 265	240	13	95 - 197	130	29
Bluefish	6	176 - 335	247	68	53 - 112	99.7	23
Brown bullhead	2	278 - 280	279	1.4	320 - 321	321	0.71
Channel catfish	1	--	193	--	--	78	--
Common carp	7	460 - 730	562	88	1,400 - 3,487	2573	717
Gizzard shad	50	352 - 495	442	29	391 - 1,763	1103	275
Striped bass	48	206 - 730	396	137	88 - 3,682	933	924
Weakfish	2	220 - 234	227	10	102 - 143	123	29
White catfish	4	122 - 360	280	109	237 - 764	482	244
White perch	164	132 - 310	206	40	41 - 428	161	90
White sucker	1	--	425	--	--	965	--

Notes:

^a Only intact fish for which complete measurements were available (length, weight) were included in this analysis.

^b SD = Standard Deviation

CPUE for Mummichog Collected from the PRSA



Summary of Length and Weight Data for Mummichog Collected from the PRSA

Males							
Station	(n)	Length Range (mm)	Average Length (mm)	Length SD ^a	Weight Range (g)	Average Weight (g)	Weight SD ^a
Fall 1999	1233	41 - 114	66.7	14.4	1.0 - 21	4.7	3.9
Spring 2000	158	45 - 110	69.8	14.4	1.0 - 19	4.7	3.5
Combined Total	1391	41 - 114	67.1	14.4	1.0 - 21	4.7	3.9

Females							
Station	(n)	Length Range (mm)	Average Length (mm)	Length SD ^a	Weight Range (g)	Average Weight (g)	Weight SD ^a
Fall 1999	1785	40 - 117	70.1	16.6	1.0 - 31	5.7	5.0
Spring 2000	157	45 - 130	79.2	16.5	1.0 - 28	7.9	5.0
Combined Total	1972	40 - 130	70.8	16.8	1.0 - 31	5.9	5.1

Station	Sex Ratio M : F
Fall 1999	1 : 1.45
Spring 2000	1.0 : 0.99
Combined Total	1 : 1.40

Notes:

^a SD - standard deviation

CPUE for Blue Crab Collected by Crab Trap from the PRSA

Sampling Event	No. of Crabs Collected ^a	No. of Traps Set	CPUE
Fall 1999	1269	262	4.84
Spring 2000	231	88	2.63
Combined Total	1500	350	4.29

Notes:

^a This number includes crabs collected that were not measured in length-weight analysis.

Summary of Lengths and Weights for Blue Crab Collected from the PRSA

Sampling Event	No. of Crabs	Length Range (mm)	Length Average (mm)	Length SD ^a	Weight Range (g)	Weight Average (g)	Weight SD ^a
Fall 1999	1,210	64 - 192	121	16	34 - 269	106	39
Spring 2000	229	161 - 158	110	16	13 - 217	85	29
Combined Total	1,439	61 - 192	119	16	13 - 269	103	38

Notes:

^a SD = Standard Deviation

Supplemental Fish Collection Program – August 2001

- Not a community survey
- Focused collection effort for supplemental fish tissue data – edible fillets for human health risk assessment
- Target species:
 - American eel
 - Catfish (i.e., catfish or bullhead)
 - Carp
- Multiple sampling gear types
- One week sampling effort

Summary of 2001 Passaic River Supplemental Fish Collection Efforts – Species Caught

Date Species		8/6/2001								8/7/2001								8/8/2001								8/9/2001								8/10/2001																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
		American Eel	Brown Bullhead	White Catfish	White Perch	Atlantic Menhaden	Striped Bass	Mummichog	Blue Crab	American Eel	Brown Bullhead	White Catfish	White Perch	Atlantic Menhaden	Striped Bass	Mummichog	Blue Crab	American Eel	Brown Bullhead	White Catfish	White Perch	Atlantic Menhaden	Striped Bass	Mummichog	Blue Crab	American Eel	Brown Bullhead	White Catfish	White Perch	Atlantic Menhaden	Striped Bass	Mummichog	Blue Crab																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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Note:

-- = sampling not conducted.

Conclusions

- PRSA fish community is limited — dominated by mummichog and blue crab
- Diversity appears low — likely due to habitat limitations